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ABSTRACT

This document reports on a cross-cultural study of mother-infant interactions. Focus is on the issue of variance and invariance in these interactions across cultures. American and Yugoslavia mother-infant pairs were observed over long periods of time in a naturalistic setting. Also, available data on Dutch, Zambian, and Sengalese mothers and infants were analyzed, so that five cultures were compared. Results indicated that there was considerable consistency in terms of the caregiving the infants received. This was discussed in relation to the invariances that exist across human cultures. Further discussion emphasized the danger of misinterpretation when behavior is studied out of context. To avoid this, it is necessary to be extremely familiar with the culture under question. (Author/DP)

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RESEARCH BULLETIN

VARIANCE AND INVARIANCE IN THE MOTHER-INFANT INTERACTION: A CROSS-CULTURAL STUDY

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This paper will be presented at the Burg Wartenstein Symposium, Cultural and Social Influences in Infancy and Childhood, Burg Wartenstein, Austria, June 18-26, 1973. It will also appear in P. H. Leiderman and S. R. Tulkin (Eds.), Cultural and social influences in infancy and early childhood. Stanford: Stanford University Press, in press.

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Variance and Invariance in the Mother-Infant Interaction: A Cross-Cultural Study[1]

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Abstract

The present paper is concerned with the issue of the variance and invariance in the mother-infant interaction. In order to study this, a sample of Yugoslavian and American mother-infant dyads was observed in detail. Moreover, using the data available on Dutch, Zambian and Senegalese mothers and infants, five different cultures were compared. In general there was considerable agreement in terms of the caregiving the infants received. This fact was first discussed in terms of its relationship to the invariances that exist across human cultures. Also considered was the issue that the study of behavior, not studied in context, can often result in serious misinterpretation. In order to avoid this it is necessary, at least, to be totally familiar with the culture under question.

Variance and Invariance in the Mother-Infant Interaction: A Cross-Cultural Study[1]

Michael Lewis and Peggy Ban

Educational Testing Service

We should like to present a brief description of a city and village community in Yugoslavia. The report is that of a trained observer who is married to a Yugoslavian and is able to speak Serbo-Croatian. This is a narrative obtained after 8 weeks of living in these two communities.

Demographic Description of Yugoslavia

Yugoslavia is a country made up of a number of diverse regions which, historically, evolved quite independently of one another. It was not until 1918, after the collapse of the Hapsburg Empire which incorporated a part of it, that the territory of Yugoslavia was defined by national borders. The region studied is known as Croatia, one of six republics of Yugoslavia. The city sample was drawn from Zagreb, capital of Croatia, and the rural sample from two villages lying approximately 10 miles to the north of the city: Zapresic and Bistra.

Until 1918 Croatia was a part of the Austro-Hungarian Empire. Loosely speaking, the people of Croatia shared with the Empire a common culture, involving education style (German), architecture (central European), religion (Roman Catholic) and government. In the following, we shall more specifically characterize the city and village samples of the present study.

City. Many of the city sample were children of university-educated parents. Since only 10 per cent of the Yugoslav population ever attend a university, these people represent a fairly specialized, professional segment of society and are in some sense equivalent to the highest social class as described by Hollingshead (1957). The religious affiliation of these people is "distantly" Roman Catholic since very few city people attend the church and use the affiliation only to celebrate the baptism of their children and, less frequently, to sanction marriage, which is now a state function. People with Communist party affiliation have, of course, relinquished all religious ties. In the present sample, it is not known who are party members.

Nearly all of the city sample live in small apartments, located near the center of the town. Often, the parents of either the mother or father share the apartment as well, resulting in fairly crowded living quarters by American standards. For instance, it is not unusual for four adults and a baby to share a three or four room apartment. The reasons for the density are the shortage of available urban housing and the need for a grandparent to be available to watch the baby when the mother returns to work, which occurs in nearly all cases. Mothers are permitted six months to one year paid maternity leave and once this is expended, most mothers return to full-time work (7 a.m. to 3 p.m. in most cases). Since pay is low in Yugoslavia, it is considered necessary for mothers to work, but in contrast with current attitudes in the United States, most Yugoslav mothers remark that they would prefer full-time motherhood. It is quite possible that the prospect of returning to full-time employment within a year in some way tempers the young Yugoslav mothers' attitudes toward their babies.

All of the city apartments were clean and well-furnished. Usually the baby sleeps in a crib in the parents' bedroom. Babies under six months were given few toys.

Few appliances were available in the home. Generally, television sets, small refrigerators, and gas stoves were present. Much less frequently were washing machines and dishwashers observed. Often the grandmother assumed many of the household chores, including cooking meals, which suggests that even with the unavailability of many appliances, the mother was generally free to attend to the child.

Yugoslav fathers, returning from work around 3 o'clock in the afternoon, have a greater amount of time in which to observe or interact with their young babies. Most fathers, when present, voluntarily interacted with the babies.

The typical Yugoslav week-day involves early arising, around 6 o'clock, so that the father can leave for work around 7 o'clock. Household chores and daily food shopping are done in the morning. Cooking the main meal begins around 1 o'clock. When the father returns at 3 o'clock, the family eats the main meal, then, customarily, rests for an hour afterward. Evening is spent in relaxing at home, incidental shopping (stores are open from 6 to 8), going to local cafes, or entertaining family or friends. A light snack is usually eaten around 9 o'clock.

Village. Both Zapresic and Bistra, the sites of the rural sample, can be characterized as villages; however, more must be stated about the dynamics of sociological change which the former, at least, is undergoing, to understand fully the nature of the families residing there.

As recently as one generation ago all the residents of both villages were dependent upon farming for subsistence. The peasant-style homes and most of the fields remain today; however, a dramatic transition is in evidence. Young men now seek and obtain industrial employment as laborers, and many travel daily

into the highly industrialized outskirts of Zagreb. This new type of employment brings in more currency than would be available to the family through farming alone. In some cases this is evidenced by the reconstruction and new building of homes into larger and more convenient styles (including indoor plumbing). New homes are two-story with brick and stucco facings and red tile roofs. A few families have acquired television sets.

Home interiors, family structure, and most importantly, social interactions, appear to be as yet unaffected or minimally affected by the changes mentioned above. The social density, like that in the cities, is quite high, and as many as six to eight adults were observed living "under one roof"--all extended family, it should be noted.

Home furnishings in the villages remain generally very simple, with only necessities present. In many cases, the bedroom and kitchen are the only two centers of activity. The kitchens, with chairs and a table, apparently substitute for living rooms and most rural observations took place there.

With the high social density, the mothers have ample opportunity for interaction with other adults, as well as with the baby. Most young village mothers are not employed. Apart from attending the baby, they occasionally work in the fields or the garden (this, of course, is seasonal, but quite demanding of time in spring and summer), or attend to the few farm animals which are nearly always present and to the household chores which are more demanding in such homes. For instance, most did not have hot running water and at least two did not have indoor water at all.

Because of the small family income, the women often must sew and knit the clothing, spend more time cooking (although prepared bread is available daily to nearly all women), and generally devote more time to household chores than their city counterparts.

A routine village day would require a very early arising, generally between 5 and 6 a.m. Husbands go off to work early and women and occasionally older men are left at home. (By older men we mean non-employed grandfathers, generally). The women do the chores during the entire morning. With a young baby, a great deal of time is devoted to the wash, which must be done by hand and traditionally is boiled on the stove since there is great fear of exposing the baby to bacteria. Cooking the main meal, as in the city, begins between noon and one o'clock. Husbands return home from work between 3 and 4 o'clock, since often they must travel some distance. Immediately, the main meal is eaten, the after-meal rest is taken, and then remaining chores are attended to. The evening is spent most often at home, where the family sit together and talk. Most village people are in bed before 10 o'clock.

As we read this description we cannot help being struck by the differences which exist between the people of these communities and those of our own--those that make up the samples usually studied in this country. A few differences are most obvious, ones which many of us might assume to have importance for child rearing practices. The family structure is the most obvious. From the above description we learn that there are large numbers of adults living together under one roof. The adult-child ratio is much higher than that which we encounter. Moreover, in our poor communities, those we call lower class, we tend to find fewer adults per nuclear family, whereas in poor Yugoslav families there are even more.

Physical space differences, as a function of the small homes and large numbers of people, also appear to be strikingly different. In American middle class homes, rooms are carefully differentiated by function (e.g., kitchens for eating in and bedrooms for sleeping in), and most often infants and children have their own rooms. This is certainly not so in Yugoslav homes.

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Differences between the cultures in the number of toys are great. Our culture calls for many varied objects with which to enlighten the child; the Yugoslav culture de-emphasizes or ignores this source of stimulation to the point that Yugoslav infants have few, if any, playthings. The consequences this might have for child-rearing may be vast.

Also striking in terms of what we observe within our homes is the absence of modern conveniences, the lack of hot water, and the lack of appliances for cleaning, preparing food, and caring for the environment. How many families studied by American psychologists wash their infants' diapers by hand? This practice should result in the mother being less centered around her child, her time and energy devoted to "housework."

These few examples make it clear to us that there are vast and potentially quite important differences between the city and village Yugoslavian households that we have just described and the American households we have so often studied. Given all these differences what is it possible to say about the interaction between a mother and her very young infant? Is it possible, in spite of these differences, to find that mothers, regardless of their cultural backgrounds or social class, behave in similar ways and that infants too share similarities?

Our point is that social class and cultural differences as they apply to child care are related to ideologies, that is, general belief systems, rooted in both their cognitive and affective systems. These ideologies (rather than behavior) and their consequences may be more related to child outcomes than we recognize. What we mean is that ideologies lead to certain maternal behaviors which in turn have consequences in the development of the child; however, there may be less connection between behavior and outcome than between ideology and outcome. As behaviorists, or at least persons committed to aspects of

behaviorism, we may err in only looking at the behavior-outcome relationships rather than considering the ideology-outcome relationship.

Consider these examples. In one family, a father must work long hours and has little time to spend with his child. However, the child is told that his father is working (not with him) in order to provide money for the family. In a second family the father also spends little time with his child, but it is not due to the amount of time he needs to spend working. Behaviorally both fathers spend the same amount of time with their children; however, the consequences for the child may be quite different. Likewise, consider an American mother who keeps her child alone in a dark, cold room compared to a Dutch mother who does the same. The outcomes in both examples will be different because the same behavior is serviced by different ideologies. Since in the American family being left alone is not the norm, while in the Dutch family it is, the meaning of the maternal act may be quite different; hostility in one case, normal affection in the other.

Also related to comparisons of different groups, is the issue of the relationship of ideology to the dimensions we often use to differentiate groups, such as income, formal education level, number of rooms and appliances, and presence of toys. We must admit we find ideologies (rather than behaviors) important, because they may explain why some groups are better able to achieve social competence and others are not. For example, groups without any of these apparent positive features have succeeded in our culture. Why these groups succeeded while present "disadvantaged groups" still have a hard time may be the difference between the ideologies of believing learning-to-be-important and being-taught-a-specific-curriculum.

We must consider that either behavior similarities or behavior differences between groups (such as social class and culture) may have extremely different

meanings and therefore outcomes. Unless we carefully study the context in which the behavior occurs we may make serious errors of interpretation. How many of us, interested in such issues as cultural or social class differences, have sufficient commerce with the groups under study to understand properly how the behaviors we observe are embedded in the culture or subculture?[2] To infer meaning from behavior without context (in a broad sense) is folly. Without such data or in the absence of understanding the ideology, the raw behavior may be worthless. There are a variety of means for understanding the behavior. One method is to gather information about the broad views and ideologies, independent of the observational procedures, that is, by living within the community, using community members as guides, and studying the ideologies themselves.[3]

Another way which is both related to and independent of this problem is the study of behavior in context. Context here refers less to the broad issue of ideology and more to such issues as situational and interactive context. By situational context we mean studying where and when behaviors occur. We have speculated that physical location as well as situational context play a crucial role in the infant's evolving meaning systems (structures) and should be studied in order to understand both the maternal and infant behaviors. In a recent study of infant vocalization behavior, Lewis and Freedle (1973) were able to demonstrate the effectiveness of studying situational context.

The interactive context is still another means to be considered. This may appear to be a methodological issue, but for every methodological problem there exists a theoretical issue. Most studies of infant behavior (including cross-cultural or cross-social class) concern themselves with the question of how much behavior of a select type is exhibited by either the infant or

its caregiver. For example, how much vocalization does the infant or mother produce in "x" minutes of observation? To study behavior this way has the advantage of ease of data collection and high reliability. It is assumed to be interactive in the sense that the behavior occurred when the infant and its caregiver were together. However, such data, if interactive at all, tap a very low level of interaction (Lewis, 1972). More importantly this method does not result in the generation of the behavior-context type of analysis that may be important. Thus, a more truly interactive analysis must be undertaken as well. We, along with others, have suggested and applied some of these interactive analyses, where one observes the initiations and responses of behaviors plus a wide variety of other interactive measures. By using these interactive measures we may learn more about the meaning of the behavior than by the use of frequency data alone.

In the present study we collected data on different cultural and social class groups (if we wish to consider the Yugoslavian city and village samples as different social classes) which are by many characteristics quite different from our own. It is important to inquire first what type of caregiving functions this culture demonstrates and secondly how they might be similar to our own. Our search is for variance and invariance in the mother-infant interaction and ultimately its relationship to ideology.

To explore this problem the first issue was how to study these infants and their mothers. We have been working on a variety of techniques for measuring the dyadic interaction between the child and its caregiver (see Lewis, 1972; Lewis & Lee-Painter, 1973; Lewis & Wilson, 1972). It must be recognized that our problem was to obtain as dynamic a picture of the infant-caregiver relationship as possible, and not merely a frequency count of behavior. This dynamic

description is necessary if we are to look at behavior in context rather than just the occurrence of behavior.

Insert Table 1 about here

The Yugoslavian subjects were all 12 weeks old (± 1 week); 11 were from the city, 7 from the villages. Table 1 presents pertinent demographic data on these infants and their parents. In order to compare the Yugoslavian data with American data we have used the data from a larger longitudinal study of mother-infant interaction. Some of these data have already been reported (Lewis, 1972). The American sample consisted of 32 12-week-old infants. Their sex and SES, determined by the Hollingshead Two-Factor Index of Social Position (1957), are presented in Table 1.

The ways to measure the mother-infant interaction have been of considerable interest to us, and to this end we have established both a procedure and a methodology for obtaining and scoring these data. We have suggested a more dynamic set of measures which explore not only the frequency of occurrence of behavior but also look at "who does what to whom and when." This procedure also allows us to observe behavior in context. In this case we mean we can observe not only how much looking or vocalizing the mother does to her infant, but more importantly, how much the mother does when the infant does something. In this way the context of the mother's vocalization is established.

To obtain data on the mother-infant interaction, it was necessary to observe each dyad over a relatively long period in a naturalistic setting. Each infant seen was three months old (± one week). Each infant was seen in its home. Contact with the American mothers was made in a variety of ways: through the mother's initiative, through birth announcements in the newspaper, and through church groups in lower socioeconomic areas. For the Yugoslavian sample contact

was made through well-baby clinics where records were kept on every child. Those who were three months were contacted and seen. For the villages this included almost all the infants who were three months old. The city sample was more selective. However, the selection basis appears to be most similar to what we find in this country, that is, the sample is composed of those willing to participate.

We have reported the reliabilities of observations of this type before (Lewis, 1972). The observer of our Yugoslavian sample was trained with those of our American sample. For the American sample the reliabilities were moderate (ranging from rho's of .55 to .95 for overall frequency of behavior). While there is no reason to assume that observer differences account for any differences in the data, this cannot be discarded since no Yugoslavian reliabilities could be obtained.

As for the American sample, the Yugoslavian mothers were instructed that the observer was interested in studying the infant's behavior. The observer remained out of the infant's sight. It was stressed that it was the infant who was to be observed. Moreover, the mother was to try to forget the presence of the observer and not engage her in conversation. When conversation was attempted, the observer reminded the mother that she was to ignore her. Prior to observation, the observer spent time with the mother attempting to put her at ease.

While every attempt was made to make the observation session as natural as possible, the presence of the observer is bound to have an effect. This problem has been discussed before (Lewis & Goldberg, 1969); in spite of the problems, however, this is the only procedure available for collecting this type of data.

The observation data were collected using a checklist sheet. Each sheet represents 60 seconds, divided into six 10-second columns. Infant behaviors are listed in the upper portion of the sheet, while caregiver behaviors are in the

lower portion. When a behavior not listed on the sheet occurred, the observer wrote it in. For the most part, the infant behavior categories are self-explanatory and include vocalize, feed, smile, extra movement, fret/cry, quiet play, and noise/nonvocalization. The "extra movement" category consisted of all gross physical movements, such as limb movement or body rolling. "Quiet play" consisted of the child watching a toy move or playing with his fingers, and noise/nonvocalization was similar to extra movement, except that noise accompanied the behavior (by kicking feet against the crib). It is clear that these behaviors are not totally exclusive, reflecting a further difficulty in studies of this sort. Although the behaviors have some overlap, observers are, in general, able to differentiate between them. Maternal behaviors listed included touch, hold, vocalize, look at, smile/laugh, play, feed, change clothes, rock, vocalize to others, read or watch TV. Mother's touch and hold categories were used to distinguish between a discrete touch versus a physical support. If during a "hold" the mother also discretely touched the child, both categories would be scored. Finally, the categories of read/watch TV and vocalize to others were used to indicate that the mother was involved in activities <u>not</u> directed toward the child.

For each 10-second interval the observer checked off the occurrence of both infant and mother behaviors, also recording when possible which behaviors preceded which.

If the infant closed his eyes for longer than 30 consecutive seconds, observation stopped. For the American sample in order to obtain two full hours of eyes-open data, a minimum of two hours of observation and on some occasions as much as three or four hours were necessary. In fact, for one-third of the sample, two visits to the home were required. Only one hour of observation was

obtained for the Yugoslavian sample. For the purpose of comparison, the Yugoslavian data were adjusted upward as if to represent two hours. This was felt appropriate since observation of time differences in the American sample failed to indicate that time influenced behavior in any systematic pattern.

Methods of Data Analysis

Various levels of interactive analysis are possible with these types of data. In several recent papers (Lewis, 1972; Lewis & Lee-Painter, 1973; Lusk & Lewis, 1972) some of the more obvious were discussed. In the present paper we shall consider three methods of data analysis.

The simplest is the frequency distribution, that is, how much of each behavior the infant exhibited in the two hours of observation. Likewise, the same data analysis is possible for the mother's behavior. While these data tap very little of the nature of mother-infant interaction, they are included to facilitate comparison with other studies as well as to use as a basis for comparing the interaction data.

Simultaneous behavior within 10-second unit involves the number of 10-second units for which both child and mother behaviors occur. Since it is often difficult to determine exactly which one of the pair initiates a behavior sequence and the time duration of the sequence, a more conservative approach is to restrict the analysis to a 10-second time unit, recognizing that it is an arbitrarily selected unit. This measure may have use as an overall responsivity measure.

Directional interactive analyses. Under this analysis, two categories of interactive behavior are possible for each specific behavior. For example, consider the infant's vocalization. One question to be asked is whether the vocalization was a response to a maternal behavior or was an initiator of a

maternal behavior, these being scored as two separate categories. This was accomplished by scoring "1" for initiating and "2" for responding. For each infant behavior, each maternal behavior also had two possible direction components. While we have illustrated this for vocalization data, it can be applied to all behavioral categories.

There are, of course, many more measures of interaction for which individual measures may be obtained. For example, one might also look at length of interaction or density of response.

Results

Frequency of Occurrence

Insert Table 2 about here

Following first the traditional presentation of data, we report the mean frequency of behavior. The data in Table 2 represent the mean number of 10 seconds in which the particular behavior occurred. The data are presented by culture, social class, and sex.

Infant behavior. In the overall comparison between the US and Yugoslavian infants there is relatively little cultural difference. Yugoslavian infants show significantly more movement than American children (Mann-Whitney U test, $p < .01$);[4] however, the difference is significant only for boys ($p < .02$). Yugoslavian children also show very much more quiet play than American children ($p < .001$).

If we look at the ordering of behavior, we find that across groups there is a high consistency of infant activities. Infants, regardless of background, show the most behavior to be vocalization and quiet play while the least is smiling and fret/cry. In fact, the correlation between the US and Yugoslavian samples is rho = .83, while between the two Yugoslavian groups (city versus

village) it is rho = .91. It would appear then that for infants' behaviors there is relatively little cultural or social class difference to be observed in terms of their frequency data.

Maternal behavior. The maternal data are also found in Table 2. A comparison of the Yugoslavian and American samples reveals some interesting differences. For example, American mothers tend to hold their infants more than Yugoslavian mothers do ($p < .10$), especially for male infants ($p < .01$); however, Yugoslavian mothers rock their infants more than American mothers ($p < .05$). Finally, Yugoslavian mothers look and smile at their infants more than American mothers ($p < .001$). Unlike the American sample, in the Yugoslavian sample there was almost no reading or TV watching (mostly because there were few books and television sets). Thus, behavior directed away from the infant is not comparable across cultures, except for vocalizing to others, where there were no Yugoslav-American differences. There were no significant Yugoslavian city-village differences in maternal behavior.

Yugoslavian mothers do seem to make more distal contact in terms of looking at their children than American mothers; however, there are no vocalization differences in terms of frequency of occurrence. The proximal contact is almost equal if one allows for a style difference between hold and rock. While these differences may reflect some underlying processes, it is important to note that Yugoslavian and American mothers behave in much the same manner. For both groups the three most frequent behaviors are hold, vocalize, and look. In fact, there is a rho of .85 ($p < .001$) between the nine maternal activities for the two samples, indicating that in general they behave in the same way (in terms of frequency), regardless of culture. The correlation between the Yugoslavian city and village is rho = .88 ($p < .001$).

Insert Table 3 about here

Before examining the interactive data, we shall briefly present the interactive percentages, these being the mean number of 10 seconds in which an infant and maternal behavior occur simultaneously. This is a parameter of responsivity which we have used. Table 3 presents the data and indicates that mothers in this observational setting are in general highly responsive. Moreover, there are no significant differences to be observed between any of the groups.

Interaction Data

Interaction data allow us to look at behavior in context. By seeing what elicits the behavior in either member of the dyad and what behaviors reinforce it, the observer has a better chance to understand the behavior's meaning and the ideology underlying it. Certainly the interaction data contain considerably more information than behavior frequency. It has been our observation that two behaviors are particularly revealing in terms of cultural or ideological meaning. These two, infant-maternal vocalization and infant fret/cry-maternal resonse, have both been shown to be especially effective in differentiating the ideology underlying social class differences in American families (Lewis & Wilson, 1972).

Insert Table 4 about here

Infant-maternal vocalization. Table 4 presents four divisions which compose the dyadic relationship centering around vocalization. The top left section involves an infant initiating a vocalization and the mean number of 10-second periods in which there were a variety of maternal responses. The top right of the table

is the mean number of 10-second periods an infant responds with a vocalization to a variety of maternal behaviors. The lower left of the table contains data on maternal initiation of a vocalization and the variety of infant responses, while the lower right is the maternal vocalization as a response to a variety of infant-initiated behaviors. We shall consider first the infant vocalization data, both as a response to and elicitor of maternal behavior.

The Yugoslavian data, like the American, shows that the vocalization-vocalization relationship is the strongest; that is, an infant vocalization is most likely to elicit a maternal vocalization as is a maternal vocalization most likely to elicit an infant vocalization. In fact, the Yugoslavian and American data are remarkably similar. The correlation between the Yugoslavian and American samples are rho = .86 ($p < .001$) and rho = .76 ($p < .001$) for infant vocalization elicits maternal behavior, and maternal behavior elicits infant vocalization, respectively. A slight difference exists in that American mothers are more likely in an absolute amount to "vocalize in response" to their infants' vocalizations than are Yugoslavian mothers ($Z = 2.26$, $p < .01$). Interestingly, while the American mothers tend to vocalize more in response to infant vocalization, Yugoslavian mothers initiate more vocalization to their infants than do American mothers.

Maternal vocalization as either an initiator of or a response to other infant behaviors shows the same pattern of high agreement between the American and Yugoslavian samples: maternal vocalization is more likely to be responded to by an infant vocalization than by a smile. There were no significant mean differences. Moreover, Yugoslavian babies are more likely to smile as a response to a maternal behavior than as an initiator. This is consistent with the American data.

Thus, when one looks at the vocalization data in the context of its interaction there are relatively few differences between the samples. It might also

be noted that there were no significant differences within the Yugoslavian sample itself; the village and city samples show the same pattern as the overall data. The data indicate that there are large invariances between a mother and her infant in regard to their vocalization data. That is, certain types of responses within this dyadic relationship remain constant across these divergent groups.

Infant fret/cry--Mother's response. A particularly interesting context in which to observe behavior of the dyad is the fret/cry behavior of the infant and the corresponding response of the mother. Unlike vocalization this relationship is asymmetrical in that we find no data (or reason) to study the responses of the infant to the mother's cry. The study of this particular aspect of the interaction is usually revealing for it is here that ideology is more likely to make itself felt. For example, in the study by Lewis and Wilson (1972) we observed differences between the social classes in their response to their infants' fret/cry behavior. Most striking was the fact that middle class mothers tended to touch their infants as a response to their cries, whereas lower class mothers tended to look at and vocalize to their infants. Investigation of these differences suggested that they had little to do with caring or not caring for their infants (i.e., mothers responded with the same density of response--only the style of response differed). Indeed, it is often assumed that the lower class mother is less concerned than the middle class mother with her child. The data on their response to distress at first glance would support this in that distal behaviors (such as look and vocalize) are often assumed less comforting than the proximal (for example, touch, hold, and rock). However, closer regard indicates that these behaviors are in the service of ideologies and strategies both similar to and different from the middle class mother. Both mothers wish

their children to adapt to a hostile, hard, and difficult social world. The middle class mother's strategy for her child's adaptation is to protect the child from the hostile world for as long as possible, while the lower class mother's strategy is to get her child "used to" the hostile world as soon as possible. In any event, let us look now at the infant fret/cry interaction data presented in Table 5.

Insert Table 5 about here

Several findings again reflect the types of invariances that we have seen before. First, as we would have expected infant fret/cry is most usually an initiator of a mother's response rather than a response to a mother's behavior. Thus, while vocalization is equally used by both members as a response and initiator, fret/cry is used as an infant initiator of maternal responses. Looking at the maternal responses also suggests invariances across the cultures; thus, across the Yugoslavian and American samples mothers tend to behave similarly (rho = .79, $p < .001$) with the three most frequent responses to a fret/cry being vocalization, touch, and look. Likewise infant fret/cry as a response shows a similar pattern across the Yugoslavian and American samples (rho = .91, $p < .001$).

If we look at the mean data, we find no significant differences although we note that Yugoslavian mothers are slightly more responsive in general than American mothers (mean number of 10-second responses across all 11 behaviors is 26.56 for Yugoslavian and 24.44 for American samples). Interestingly, while

Yugoslavian mothers tend to be more responsive, American mothers vocalize and play more with their children in response to their fret/cry behavior. Observation of the city and village samples within Yugoslavia indicate the same type of differences. The mothers of the city group vocalize more in response to their infants' fret/cry than the village mothers (mean of 10.56 versus 5.56, $p < .05$), while the village mothers tend to respond more proximally to their infants by touching and holding in response. Thus, the American-Yugoslavian differences are in some sense paralleled by the city-village differences in response.

If one looks at infant fret/cry as a response to a maternal behavior, we find relatively little difference between samples and categories of maternal behavior. This, of course, is due to the fact that fret/cry so rarely occurs as an infant response. Interestingly, in both samples it occurs most as a response to a maternal vocalization, an interesting invariance.

General Invariances across Cultures

What emerges from this detailed description of the Yugoslavian city and village and the American samples? It becomes apparent that there are many more similarities than differences, many more invariances than variances. Even the variances seem to be substitutions rather than absolutes. Thus, for example, while Yugoslavian mothers show more proximal behaviors in response to infant stress, American mothers show more distal behaviors. Even so there is remarkably little difference between the behavior of our two samples. This is in spite of the fact that the demographic description would lead one to conclude that vast differences exist between the worlds of the Yugoslavian and American infants. This is rather remarkable when one considers the rather vast and all pervasive difference between the cultures (and subcultures). How could this be? Is it

possible that we just happened to select two cultures which are very much alike? In order to answer this we compared data from several other studies: Rebelsky and Abeles' (1969) study in Holland; Lusk and Lewis' (1972) study of the Wolof of Senegal; and Goldberg's study in the United States and Zambia (1970).

Unfortunately only a limited amount of similar data were collected across studies and this all involved frequency of occurrence data. For each of the five cultures, American, Dutch, Zambian, Senegalese, and Yugoslavian, we could obtain data on frequency of maternal touch, hold, vocalize, smile, look at, and play with infant. Because of limited information only the rank order of these behaviors is available for each culture.

Insert Table 6 about here

Table 6 presents the data. The coefficient of concordance ($\underline{r}$ = .575, $\underline{p} < .01$) indicates that there is rather a large invariance among the five widely divergent cultures. Even at this gross level there is high inter-cultural consistency in maternal behavior.

Interestingly, when individual correlations are computed (see Table 6), the highest correlations are between the Dutch-Yugoslavian mothers followed by the American-Dutch and American-Yugoslavian. The two African cultures show little relationship to one another (they are from widely different parts of the African continent), and their correlations with the three Western groups are moderately low. Thus, even in the midst of invariance there are variances, the nature of which this weak frequency data fail to make clear. The detailed interaction data would seem to support the belief that young infants and their mothers (substitute caregivers in some cases) interact in some predictable and invariant manner. For example, both mother and infant use vocalization behavior as a response to and

elicitor of the other's behavior. Infant smile is almost always a response to a maternal behavior, and fret/cry is almost always an elicitor of rather than a response to maternal behavior. Across all cultures maternal smile and play occur infrequently, while hold and look are relatively frequent. These are just some examples of the invariances. Closer inspection with data more sensitive to mother-infant interaction would, no doubt, reveal much more. This is not surprising since the needs of the human infant and the abilities of the human mother should be universal. That there is relatively great similarity in the infant-mother relationship in the face of such cultural divergence suggests several possible conclusions.

First, one might conclude that because there are relatively few measurable differences in different culture's modes of behavior toward their infants, what happens in infancy may not be relevant for subsequent adaption to the cultural values. While we do not necessarily believe this to be the case, increasing evidence suggests little individual stability in intellectual functioning, at least as measured by conventional psychometric instruments, exists in the opening years (Lewis & McGurk, 1972; Lewis, 1973) and that there is relatively little consistency between birth and two years in terms of temperament variables (Bell, Weller & Waldrop, 1971).

An alternative hypothesis is that we have not observed the proper variables. In the first and simplest case, the behaviors most of us have been studying may have been a poor guess as to the variables really affecting subsequent infant development. In the second case, these may have been improper variables because we have looked at behavior rather than ideology. Thus, even if the behaviors observed show no differences, the ideology underlying them might still produce differential outcomes. Implied here is that total cultural context is more important than isolated behaviors,

and that the absence of either books or the time to read to the child (behaviors we measure and think important) tells us little about the cognitive and motivational thirsts for knowledge. These latter may be instilled without immediately obvious behavioral manifestations, thus resulting in the mismatch between behavior and outcome and the match between ideology and outcome.

Finally, these results suggest that we may do well to turn our attention to the invariances in infants' social-emotional as well as cognitive worlds. This implies that one research strategy is to determine how people (in this case children) are alike and how the human condition, like the world we live in, imposes certain types of invariances, the meanings of which manifest themselves differentially depending upon the context in which they occur.

Social Class Differences

Observation of the demographic data of Table 1 leads one to conclude that the city-village differences within the Yugoslavian culture might be the same as social class differences, defined by the Hollingshead scale (1957), in the American culture. If one were to consider the education and occupation level of the fathers, then the city-village distinction would be SES I versus SES V. In some sense, one could claim that social class differences, as distinct from culture, could be compared. The frequency data of Table 2 present no support for this assumption. That is, the Yugoslavian city families are not behaving like the American SES I nor are the village families like the American SES V. In fact, if anything, the Yugoslavian city families are more similar to the SES V while the Yugoslavian village families are more similar to the American SES I groups. This is not surprising since the Yugoslavian city families and SES V American families are most likely to have mothers who work. This, of course, raises the issue as to what is meant by social class. Inquiry into this question

supplies few answers, but these are usually restricted to such obvious differences as education and income level. Like cultural differences, such obvious differences as educational level and income must be carrier variables for the more important psychological variables of ideology. The distinctions we make as a function of social class must eventually give way to those dealing with what we have called ideologies, for unless we do so we may deal with a relatively insignificant system of classification. This should not alarm us since our use of social class to demonstrate differences has never been grounded on a sound theoretical basis. In fact, social class data reflect our desire to find individual differences rather than to discover process. Our attention should be drawn to process rather than difference. The use of divergent groups should facilitate our knowledge of process since it may increase the variability of both maternal and infant behavior; however, to stop at differences is false science. The problems of social class as a construct are never more obvious than in cross-cultural studies. That we continue to use it may underline concerns which do not truly belong in the realm of a science of psychology.

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Footnotes

[1]The data gathered for this report and the data analysis were supported by the Spencer Foundation. Apprecation is to be given to Susan Lee-Painter for data analysis.

[2]One way to study meaning is by studying behavior in context. To do this it is important to utilize members of the meaning group being studied. This presents a special problem since it is necessary to obtain a community member who both understands the experimenter's culture (including the scientific procedure or parts of it) as well as his own. This may not be possible since each may act to distort the other. Imagine a cultural value of a group which has as its premise the assumption that members do not tell each other unpleasant things. How does the intermediate observer from both the culture and the examining culture get around this psychological situation? To press for unpleasant information, or even to realize that the culture has this "unreal" view, is to be no longer a member of the culture and therefore of limited use in getting at the contextual basis of the behavior. It is not an easily solved problem and too often superficially examined.

[3]We have not directly spoken to the issue of where ideologies come from. We have suggested that they are cognitively based and are a consequence of the organism's interaction with his world. The origin of ideologies is a most important subject, one which requires study in itself.

[4]All tests are non-parametric and are Mann-Whitney U tests unless otherwise stated. All p values are two-tailed.

Table 1

Demographic Data

Yugoslavian Sample

Subj. #	Age	#Years Education	Father's Occupation
Village Male			
501	22	8	truck driver
503	39	8	factory worker
505	35	8	factory worker
507	30	11	painter
509	37	11	carpenter
Village Female			
502	28		factory worker
504	22	8	factory worker
506	36	8	truck driver
508	31	6	construction worker
$\bar{X}$	31.1	8.5	
City Male			
511	36	17	electrical engineer
513	22	15	student/model
515	32	17	architect
517	30	16	chemical engineer
519	30	16	univ. student
521	27	12	building foreman
City Female			
510	27	12	building foreman
512	32	18	orchestra conductor
514	24	11	mechanic
$\bar{X}$	28.9	14.9	

American Sample

SES	#Males	#Females	#Total	$\bar{X}$ Educ. Father
I	2	3	5	19.4
II	4	4	8	15.6
III	4	5	9	13.5*
IV	3	0	3	12.0
V	4	3	7	11.3**

* one infant has no father
** three infants have no father

Summary of Yugoslavian Sample

	#Males	#Females	#Total	$\bar{X}$ Educ. Father
Village	5	4	9	8.5
City	6	3	9	14.9

Table 2

Behavior Frequencies: Mean Number of 10-Second Periods

Infant Behaviors	Total		Male		Female		Yugoslavia		United States				
	Yugo	US	Yugo	US	Yugo	US	City	Village	I	II	III	IV	V
Vocalize	154.4	170.8	159.4	172.1	146.5	169.2	147.3	161.6	102.4	121.0	220.3	175.7	235.4
Movement	156.2	96.5	164.9	87.4	142.6	106.7	151.1	161.3	75.3	72.2	72.0	48.7	189.4
Fret/cry	90.4	77.3	104.9	72.8	67.7	82.3	100.2	80.7	99.0	114.8	60.9	62.7	47.4
Play	418.6	108.0	423.5	99.3	410.9	117.9	359.1	477.3	99.0	142.8	120.3	77.3	93.9
Smile	25.8	37.3	25.5	36.6	26.3	35.8	33.5	18.0	23.9	29.4	39.0	24.3	53.7

Maternal Behaviors	Total		Male		Female		Yugoslavia		United States				
	Yugo	US	Yugo	US	Yugo	US	City	Village	I	II	III	IV	V
Touch	113.0	126.7	116.9	128.7	108.9	124.5	128.7	97.3	92.2	135.4	123.8	137.7	163.6
Hold	234.7	307.3	198.0	356.9	292.3	251.0	265.3	204.0	231.9	264.8	352.5	356.7	361.6
Vocalize	270.2	257.2	247.5	227.1	306.0	291.3	312.9	227.6	227.9	215.0	313.9	293.7	244.7
Look	374.6	174.3	344.2	145.1	422.3	207.4	407.3	341.8	169.7	111.6	173.3	166.7	229.4
Smile	99.8	33.0	97.1	37.0	104.0	28.4	105.8	93.8	17.6	25.2	35.9	31.7	55.6
Play	79.8	86.8	71.6	84.3	92.6	89.5	109.6	50.0	44.9	84.6	118.1	78.0	110.0
Rock	31.6	10.1	28.7	14.5	36.0	5.0	23.3	39.8	12.0	20.8	5.0	8.0	8.0
Voc/other	104.4	96.7	109.1	109.5	97.1	82.3	80.9	128.0	113.3	61.0	84.8	182.7	77.7
Read/TV	1.9	48.5	3.1	57.1	0.0	38.9	3.8	0.0	25.4	5.2	62.0	8.3	111.00

Table 3

Percentage of 10-Second Periods in Which an Infant Behaved and There Was a Simultaneous Maternal Behavior

	Yugoslavia	United States
Total	.68 (18)	.70 (32)
Male	.64 (11)	.72 (17)
Female	.74 (7)	.68 (15)
US I		.69 (9)
II		.59 (5)
III		.88 (8)
IV		.78 (3)
V		.69 (7)
Yugo. City	.74 (9)	
Yugo. Village	.62 (9)	

Table 4

Vocalization Interaction Matrix

Maternal Behaviors	Infant initiates vocalize, mother responds						Mother initiates, infant responds with vocalization					
	Male		Female		Total		Male		Female		Total	
	Yugo	US	Yugo	US	Yugo	US	Yugo	US	Yugo	US	Yugo	US
Touch	0.54	1.50	2.00	0.55	1.12	1.08	8.00	4.07	4.28	6.55	6.56	5.16
Hold	0.00	1.29	0.28	0.18	0.12	0.80	1.10	3.64	2.58	8.09	1.66	5.60
Vocalize	14.72	32.07	22.86	37.00	17.88	34.24	25.28	18.43	27.72	29.27	26.22	23.20
Voc/other	0.36	1.29	0.00	0.64	0.22	1.00	1.46	0.00	0.28	0.27	1.00	0.12
Look	1.82	2.86	3.72	1.73	2.56	2.36	11.46	4.79	6.86	8.45	9.66	6.40
Smile	2.00	2.86	7.14	2.64	4.00	2.76	11.46	4.64	8.00	7.45	10.12	5.88
Play	0.00	0.57	0.28	0.36	0.12	0.48	5.46	5.71	2.00	10.64	4.12	7.88
Change					0.00	0.12					0.88	0.72
Feed					0.22	0.32					0.22	0.80
Rock					0.22	0.12					0.34	0.04
Read					0.00	0.12					0.00	0.20

Infant Behaviors	Mother initiates vocalize, infant responds						Infant initiates, mother responds with vocalization					
	Male		Female		Total		Male		Female		Total	
	Yugo	US	Yugo	US	Yugo	US	Yugo	US	Yugo	US	Yugo	US
Vocalize	25.28	18.43	27.72	29.27	26.22	23.20	14.72	32.07	22.86	37.00	17.88	34.24
Movement	0.72	2.57	1.72	2.18	1.12	2.40	7.08	11.50	12.86	10.09	9.34	10.88
Fret/cry	0.72	1.93	0.86	2.45	0.78	2.16	17.46	16.86	14.00	21.00	16.12	18.68
Play	0.36	1.71	0.00	1.00	0.22	1.40	0.72	3.00	0.58	1.45	0.66	2.32
Smile	14.90	9.79	14.58	13.09	14.78	11.24	1.28	2.86	2.00	1.82	1.56	2.40

Table 5

Fret/Cry Interaction Matrix

	Infant initiates fret, mother responds						Mother initiates, infant responds with fret					
	Male		Female		Total		Male		Female		Total	
	Yugo	US	Yugo	US	Yugo	US	Yugo	US	Yugo	US	Yugo	US
Touch	2.90	1.50	1.72	2.27	2.44	1.84	0.36	0.29	1.14	0.64	0.66	0.44
Hold	1.46	1.00	1.72	1.27	1.56	1.12	0.18	0.14	0.28	0.36	0.22	0.24
Vocalize	17.46	16.86	14.00	21.00	16.12	18.68	0.72	1.93	0.86	2.45	0.78	2.16
Voc/other	1.10	0.14	0.28	0.00	0.78	0.08	0.00	0.00	0.00	0.00	0.00	0.00
Look	3.64	1.71	1.42	0.91	2.78	1.36	0.72	0.74	0.00	0.27	0.44	0.20
Smile	2.00	0.14	1.14	0.27	1.66	0.20	0.36	0.00	0.00	0.00	0.22	0.00
Play	0.54	0.43	0.00	1.18	0.34	0.76	0.18	0.00	0.00	0.00	0.12	0.00
Change					0.00	0.08					0.34	0.04
Feed					0.22	0.28					0.00	0.00
Rock					0.66	0.04					0.00	0.00
Read					0.00	0.00					0.00	0.00

Table 6

Rank Order of Frequency of Select Maternal Behavior by Cultures

Rank	Zambian N=38	Dutch N=11	Senegal N=10	American N=32	Yugoslavian N=18
1	Hold	Look	Vocalize	Hold	Look
2	Look	Hold	Touch	Vocalize	Vocalize
3	Touch	Vocalize	Hold	Look	Hold
4	Smile	Touch	Smile	Touch	Touch
5	Play	Smile	Look	Play	Smile
6	Vocalize	Play	Play	Smile	Play

Spearman Rank Order Correlations between Cultures

US →	Dutch	.77
→	Yugoslavia	.71
→	Zambia	.35
→	Senegal	.49
Dutch →	Yugoslavia	.94
→	Zambia	.54
→	Senegal	.26
Yugoslavia →	Zambia	.30
→	Senegal	.35
Zambia →	Senegal	-.14